

REMARKS/ARGUMENTS

Claims 9, 10, 13, 15-24, and 27, 29-34 are pending in the present application. Claims 12, 14, 26 and 28 have been currently canceled. Claims 11 and 25 were canceled in a prior amendment. Claims 9 and 23 have been currently amended. Support for the amended claims can be found throughout the specification and in the original claims. Particular support for amended Claims 9 and 23 can be found in original Claims 4 and 6, and on pages 11, 12, 19 and 22 of the specification. No new matter is believed to have been introduced by these amendments.

Applicants respectfully request that the Examiner provide acknowledgment of priority document JP1999-168948, submitted in a "Request for Priority" on February 8, 2002.

Applicants also respectfully request that the Examiner review and provide acknowledgment of the related cases submitted in an Information Disclosure Statement, filed July 5, 2002, by returning to Applicants' undersigned representative an initialed, signed and dated copy of the corresponding "List of Related Cases" sheet.

Applicants have also filed, herewith, an Information Disclosure Statement.

Applicants wish to thank the Examiner for his helpful discussion on January 26, 2004 with Applicants' undersigned representative. The following is intended to expand on that discussion.

Claim Rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a)

The Examiner rejected Claims 9, 10, 12, 14-21, 23, 24 and 26-34 under 35 U.S.C. § 102(b), as anticipated by, or in the alternative, under 35 U.S.C. § 103(a), as obvious over, Japanese Patent Application 1995-189153 (hereinafter '153 reference). Applicants respectfully traverse this rejection for the following reasons.

Applicants have canceled Claims 12, 14, 26 and 28, thus rendering the rejection to these claims moot. Applicants amended Claims 9 to recite, in part, that the alkaline cooking liquor comprises polysulfide sulfur, at a concentration of at least about 8 g/l, calculated as sulfur, and Na<sub>2</sub>S-state sulfur, at a concentration of at least about 10 g/l, calculated as Na<sub>2</sub>O. Claim 23 was amended in a similar fashion.

The '153 reference discloses a polysulfide sulfur concentration of 5.88 g/l (as sulfur) (see paragraph [0031]). Applicants have enclosed, herewith, as Exhibit A, an English translation of paragraph [0016] of the '153 reference. Paragraph [0016] provides polysulfide sulfur in the range of 0.3 to 2.2%, by weight, based on chips. The composition of the cooking liquor described in [0016] of this reference, compares the amount of polysulfide sulfur to chips, and thus, the polysulfide sulfur concentration is not directly comparable to the amount of cooking liquor. Paragraph [0008] of this reference, apparently provides a liquid ratio of 3-10, and this ratio is apparently based on the volume amount of cooking liquid, in liters, per kilogram of chips. Applicants submit that as the amount of cooking liquor decreases, its concentration increases. Thus, for one kilogram of chips, and a liquid ratio of "3," the cooking liquid amount would be 3 liters, and the amount of polysulfide sulfur would be 22 g. This would result in a polysulfide sulfur concentration of 7.3 g/l. Thus, from the above analysis, the '153 reference provides a maximum polysulfide sulfur concentration of 7.3 g/l. Therefore, the '153 reference does not teach or suggest a cooking liquor that comprising polysulfide sulfur at a concentration of at least about 8 g/l, calculated as sulfur, and Na<sub>2</sub>S-state sulfur at a concentration of at least about 10 g/l, calculated as Na<sub>2</sub>O. Moreover, the '153 reference does not teach or suggest these features in addition to the required oxidation-reduction potentials of the optimized quinone-hydroquinone compounds, as recited in Applicants' pending claims.

Therefore, for at least these reasons, the '153 reference does not anticipate, and does not render obvious the claimed invention, and the rejections should be withdrawn.

In addition, Applicants have filed, herewith, a Declaration under 37 CFR § 1.132, which provides unexpected advantages in the stability of the polysulfide sulfur in the pulping liquor, and improved pulp yield with pulping liquors containing compositions that fall within the scope of the pending claims. For example, as shown in the Declaration, when the Na<sub>2</sub>S-state sulfur concentration is at least 10 g/l, calculated as Na<sub>2</sub>O, an unexpected improvement in the stability of a high concentration (7.8 g/l) of polysulfide sulfur is observed. The '153 reference does not teach or suggest this unexpected improvement in the stability of high concentrations of polysulfide sulfur, with the addition of Na<sub>2</sub>S-state sulfur concentration of at least 10 g/l.

Moreover, Applicants have also provided comparative data showing a significant improvement in pulp yield, when a pulping liquor contains a high concentration of polysulfide sulfur (8.1 g/l) and a Na<sub>2</sub>S-state sulfur within the claimed range (see Example No. 1 in Study B). As shown in Study B of the Declaration, a polysulfide sulfur concentration of 5.9 g/l (as S), with a Na<sub>2</sub>S-state sulfur concentration of 12.0 g/l (as Na<sub>2</sub>O), provides for a yield of pulp of 53.4%. Applicants note that the '153 reference discloses a cooking liquor that contains 5.88 g/l polysulfide sulfur (as S), and a Na<sub>2</sub>S concentration of 12.0 g/l (see paragraph [0031]). Thus, Comparative Example 5 is similar in composition to the actual working example disclosed in the '153 reference. However, as shown by Example No. 1, in Study B, a polysulfide sulfur concentration of 8.1 g/l (as S), with a Na<sub>2</sub>S-state sulfur concentration of 13.5 g/l (as Na<sub>2</sub>O), provides a pulp yield of 54.3%, a significant improvement in pulp yield of 0.9%, which translates to a yearly reduction of 6 million tons of wood chips.

The results presented in the Declaration are sufficient to rebut the Examiner's assertion of obviousness. The '153 reference does not teach or suggest an improvement in pulp yield using the combination of claimed polysulfide sulfur concentration and Na<sub>2</sub>S-state sulfur concentration, and does not teach or suggest an improvement in pulp yield using such combination with the required oxidation–reduction potentials of the optimized quinone-hydroquinone compounds, as claimed. In addition, as discussed above, the '153 reference does not teach or suggest this unexpected improvement in the stability of high level of polysulfide sulfur concentration, with the addition of Na<sub>2</sub>S-state sulfur concentration of at least 10 g/l. This improved stability further leads to improvements in pulp yield.

Therefore, as discussed above, the '153 reference does not teach or suggest the claimed invention, and the rejections should be withdrawn.

The Examiner rejected Claims 13, 22 and 34 under 35 U.S.C. § 103(a), as unpatentable over the '153 reference, in further view of WO 97/41295 (hereinafter the '295 reference). Applicants respectfully traverse this rejection for the following reasons.

Neither the '153 reference nor the '295 reference teach or suggest a cooking liquor comprising the combination of a polysulfide sulfur at a concentration of at least about 8 g/l, calculated as sulfur, Na<sub>2</sub>S-state sulfur at a concentration of at least about 10 g/l, calculated as Na<sub>2</sub>O, and the quinone-hydroquinone compounds with the required oxidation–reduction potentials, as recited in Applicants' pending claims.

As discussed above, the '153 reference does not teach or suggest a cooking liquor that comprises polysulfide sulfur at a concentration of at least about 8 g/l, calculated as sulfur, in combination with Na<sub>2</sub>S-state sulfur at a concentration of at least about 10 g/l, and further does not teach or suggest this combination with the quinone-hydroquinone compounds with the required oxidation–reduction potentials.

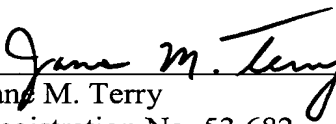
The '295 reference is directed to a method of producing polysulfides using an electrolytic cell (see Abstract). This reference does not teach or suggest the use of polysulfide sulfur concentration of at least about 8 g/l, in combination with Na<sub>2</sub>S-state sulfur at a concentration of at least about 10 g/l, and quinone-hydroquinone compounds providing the required oxidation-reduction potentials, as recited in Applicants' pending claims.

Therefore, for at least the above reasons, the combination of the '153 reference and the '295 reference, does not teach or suggest the invention as now claimed, and the rejection should be withdrawn.

Applicants respectfully submit that the present amendment now places the application in condition for allowance, and respectfully request early notice of such action.

Respectfully submitted,

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